HIV INFECTION/AIDS

DISEASE REPORTING

In Washington

DOH receives 600 to 800 reports of HIV and AIDS per year, for an average rate of 12.0/100,000 persons. An average of 125 deaths are reported to be associated with HIV and AIDS each year.

Purpose of reporting and surveillance

- To identify those who are infected.
- To offer HIV prevention, care, and partner notification services to those found to be infected.
- To generate epidemiologic data to be used to plan, target, evaluate, and allocate resources for HIV prevention and care services.

Reporting requirements

- Health care providers: notifiable within 3 workdays
- Hospitals: notifiable within 3 workdays
- Laboratories:
    - For HIV, positive Western blot assays, p24 antigen or viral culture tests are notifiable within 2 workdays. Positive results on HIV nucleic acid tests (RNA or DNA) are notifiable on a monthly basis
    - For AIDS, CD4+ counts <200 or 14% are notifiable on a monthly basis
- Local health jurisdictions: notifiable within 7 days of case investigation completion or summary information required within 21 days

Clinical criteria for diagnosis, laboratory criteria for diagnosis, case definition

Refer to:

- CDC. Guidelines for National Human Immunodeficiency Virus Case Surveillance, Including Monitoring for Human Immunodeficiency Virus Infection and Acquired Immunodeficiency Syndrome (including Appendix: Revised Surveillance Case Definition for HIV Infection). MMWR 1999;48(No.RR-13);1-31. http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4813a1.htm

A. DESCRIPTION

1. Identification

AIDS is a severe disease syndrome that was first recognized in 1981. This syndrome represents the late clinical stage of infection with the human immunodeficiency virus (HIV). Within several weeks to several months after infection with HIV, many persons develop an acute self-limited mononucleosis-like illness lasting for a week or two. Infected persons may then be free of clinical signs or symptoms for many months or years before other clinical manifestations develop. The severity of subsequent HIV related opportunistic infections or cancers is, in general, directly correlated with the degree of immune system dysfunction. More than a dozen opportunistic infections and several cancers were considered to be sufficiently specific indicators of the underlying immunodeficiency for inclusion in the initial case definition of AIDS developed by CDC in 1982. These diseases, if diagnosed by standard histologic and/or culture techniques, were accepted as meeting the surveillance definition of AIDS developed by CDC, if other known causes of immunodeficiency had been ruled out.

In 1987, this definition was revised to include additional indicator diseases and to accept as a presumptive diagnosis some of the indicator diseases if laboratory tests showed evidence of HIV infection. In 1993, CDC again revised the surveillance definition of AIDS to include additional indicator diseases. In addition, all HIV infected persons with a CD4+ cell count of less than 200/cu mm or a CD4+ T-lymphocyte percentage of total lymphocytes less than 14%, regardless of clinical status, are regarded as AIDS cases. Aside from the low CD4 count criteria, CDC's 1993 definition has been generally accepted for clinical use in most developed countries, but it remains too complex for developing countries. Developing countries often lack adequate laboratory facilities for the histologic or culture diagnosis of the specified surrogate indicator diseases. WHO revised an African AIDS case definition for use in developing countries in 1994: it incorporates HIV serologic testing, if available, and includes a few indicator diseases as diagnostic in seropositive individuals. The clinical manifestations of HIV in infants and young children overlap with failure to thrive, inherited immunodeficiencies and other childhood health problems. CDC and WHO have published pediatric AIDS case definitions.

In the mid-1990s, advances in HIV treatment slowed the progression of HIV disease for infected persons on treatment and contributed to a decline in AIDS incidence in the US. These advances in treatment made AIDS surveillance data less useful for describing trends in the epidemic. Consequently, in 1999 CDC recommended that all states and territories conduct case surveillance for HIV as an extension of AIDS surveillance activities.

The proportion of HIV infected persons who, in the absence of anti-HIV treatment, will ultimately develop AIDS has been estimated to be over 90%. In the absence of effective anti-HIV treatment, the AIDS case-fatality rate is very high: most (80%-90%) patients in developed countries died within 3-5 years after the diagnosis of AIDS. However, routine use of prophylactic drugs to prevent *Pneumocystis carinii* pneumonia and other opportunistic infections in the USA and most developed countries was able to delay the

development of AIDS and death significantly prior to the routine availability of effective anti-HIV treatment.

Serologic tests for antibodies to HIV have been available commercially since 1985. The most commonly used screening test (EIA or ELISA) is highly sensitive and specific. However, when this test is reactive, it must be supplemented by an additional test, such as the Western blot or indirect fluorescent antibody (IFA) test. A nonreactive supplemental test negates the initial reactive EIA test; a positive reaction supports it, and an indeterminate result in the Western blot test calls for further evaluation. WHO recommends as an alternative to the routine use of Western blots and the IFA, the use of another EIA test that is methodologically and/or antigenically independent of the initial EIA tests. Because of the extreme personal significance of a positive HIV antibody test, it is recommended that an initial positive test be confirmed with a second specimen from the patient so as to eliminate possibilities of mislabeling and transcription errors.

Most persons infected with HIV develop detectable antibodies within 1-3 months after infection; occasionally, there may be a more prolonged interval of up to 6 months, with only very rare instances of individuals developing antibodies after 6 months. Other tests to detect HIV infection during the period after infection but prior to seroconversion are available, and include tests for circulating HIV antigen (p24) and PCR tests to detect viral nucleic acid sequences. Since the window period between the earliest possible detection of virus and seroconversion is short (less than 2 weeks), diagnosis of HIV infection with these tests is rare. However, these tests are particularly helpful in diagnosing HIV infection in young babies born to HIV infected women since passively transferred maternal anti-HIV antibodies often cause anti-HIV EIA tests in these infants to be falsely positive even up to the age of 15 months. The absolute T-helper cell (CD4+) count or percentage is used most often to evaluate the severity of HIV infection and to help clinicians make decisions about therapy.

2. Infectious Agent

Human immunodeficiency virus (HIV), a retrovirus. Two types have been identified: type 1 (HIV-1) and type 2 (HIV-2). These viruses are serologically and geographically relatively distinct but have similar epidemiologic characteristics. The pathogenicity of HIV-2 is lower than that of HIV-1.

3. Worldwide Occurrence

AIDS was first recognized as a distinct clinical entity in 1981; in retrospect, however, isolated cases occurred during the 1970s in the USA and in several other areas of the world (Haiti, Africa and Europe). By late 1999, over 700,000 cases of AIDS had been reported in the USA. Although the USA has recorded the largest number of cases, the estimated cumulative and annual AIDS case rates are much higher in most sub-Saharan African countries. Worldwide, WHO estimates that about 13 million AIDS cases (with about two thirds in sub-Saharan Africa) had occurred by 1999.

In the USA, the distribution of AIDS cases by risk behaviors or factors has shifted over the past decade. Although the AIDS epidemic in the USA continues to affect primarily men who have sex with men, the largest increases in rates of reported AIDS cases during the latter half of the 1990s have been among women and minority populations. In 1993 AIDS emerged as the leading cause of death in Americans aged 25-44, but it dropped to second place after unintentional injuries in 1996. However, HIV infection still remains the leading cause of death for black men and women aged 25-44. The reductions in AIDS incidence and deaths in North America since the mid-1990s are largely attributable to more effective antiretroviral therapy, although prevention efforts and the natural evolution of the epidemic have played some role. HIV/AIDS associated with injecting drug use continues to play a central role in the HIV epidemic that affects minorities of color in the USA. Heterosexual transmission of HIV is steadily increasing in the USA and is the predominant mode of HIV transmission throughout the developing world. The immense disparity in access to antiretroviral therapy between developed and developing countries is illustrated by the decrease in annual AIDS deaths in all developed countries since the mid-1990s compared with the steeply rising annual AIDS deaths in most developing countries with high HIV prevalence.

In the USA and other western developed countries, annual HIV incidence decreased markedly shortly before the mid-1980s and has remained relatively low since then. However, in the most severely affected countries in sub-Saharan Africa, annual HIV incidence has continued almost unabated at high levels through the 1980s and 1990s. Outside sub-Saharan Africa, high HIV prevalence rates (more than 1%) in the total 15-49 year old population have been noted only in a few countries in the Caribbean and in south and southeast Asia. Of the estimated 33.4 million persons living with HIV/AIDS around the world in 1999, there were an estimated 22.5 million in sub-Saharan Africa, 6.7 million in south and southeast Asia, 1.4 million in Latin America and 665,000 in the USA. Globally, AIDS has caused more than 14 million deaths, including 2.5 million in 1998. HIV-1 is the most prevalent HIV type throughout the world; HIV-2 has been found primarily in west Africa, with some cases in countries that are linked epidemiologically to west Africa.

4. Reservoir

Humans.

5. Mode of Transmission

HIV can be transmitted from person to person through sexual contact; the sharing of HIV contaminated needles and syringes; transfusion of infected blood or its components; and the transplantation of HIV infected tissues or organs. While the virus has occasionally been found in saliva, tears, urine and bronchial secretions, transmission after contact with these secretions has not been reported. The risk of HIV transmission via sexual intercourse is much lower than most other sexually transmitted agents. However, the presence of a concurrent sexually transmitted disease, especially an ulcerative one like chancroid, can greatly facilitate HIV transmission. The primary determinants of sexual transmission of HIV

are the patterns and prevalence of sexual risk behaviors such as having unprotected sexual intercourse with many concurrent or overlapping sexual partners. No laboratory or epidemiologic evidence suggests that biting insects have transmitted HIV infection. The risk of transmission from oral sex is not easily quantifiable, but is presumed to be low.

From 15% to 30% of infants born to HIV positive mothers are infected before, during or shortly after birth: treatment of pregnant women with antivirals such as zidovudine results in a marked reduction of infant infections. Breast feeding by HIV infected women can transmit infection to their infants and can account for up to half of mother to child HIV transmission. After direct exposure of health care workers to HIV infected blood through injury with needles and other sharp objects, the rate of seroconversion is less than 0.5%, much lower than the risk of hepatitis B virus infection (about 25%) after similar exposures.

6. Incubation period

Variable. Although the time from infection to the development of detectable antibodies is generally 1-3 months, the time from HIV infection to diagnosis of AIDS has an observed range of less than 1 year to 15 years or longer. Without effective anti-HIV treatment, about half of infected adults will develop AIDS within 10 years after infection. The median incubation period in infected infants is shorter than in adults. The increasing availability of effective anti-HIV therapy since the mid-1990s has significantly reduced the development of AIDS in the USA and most other developed countries.

7. Period of communicability

Unknown; presumed to begin early after onset of HIV infection and extend throughout life. Epidemiologic evidence suggests that infectiousness increases with increasing immune deficiency, clinical symptoms and presence of other STDs. Epidemiologic studies indicate that infectiousness is high during the initial period after infection.

8. Susceptibility and resistance

Unknown, but susceptibility is presumed to be general: race, gender and pregnancy do not appear to affect susceptibility to HIV infection or AIDS. The presence of other STDs, especially those with ulcerations, may increase susceptibility, as may the absence of male circumcision. This latter factor may be related to the general level of penile hygiene. Whether Africans progress from HIV infection to AIDS more rapidly than other populations continues to be studied. The only accepted factor that significantly affects progression from HIV infection to the development of AIDS is age at initial infection. Adolescent and adult males and females who acquire HIV infection at an early age progress to AIDS more slowly than those infected at an older age.

Potential interactions between HIV and other infectious disease agents have caused great medical and public health concern. The only major interaction identified so far is with Mycobacterium tuberculosis (Mtbc) infection. Persons with latent Mtbc infection who are also infected with HIV develop clinical tuberculosis (TB) at an increased rate. Instead of a

10% lifetime risk of developing TB, 60%-80% of adults with dual infections may develop TB. This interaction has resulted in a parallel pandemic of TB: in some urban sub-Saharan African populations where 10%-15% of the adult population have dual infections (HIV and Mtbc), annual TB rates increased 5-10 fold during the latter half of the 1990s. No conclusive data indicate that any infection, including Mtbc infection, accelerates progression to AIDS in HIV infected persons.

B. METHODS OF CONTROL

1. Preventive measures:

Preventive measures: HIV/AIDS prevention program can be effective only with full political and community commitment to change and/or reduce high HIV risk behaviors.

a. Public and school health education must stress that having multiple and especially concurrent and/or overlapping sexual partners and sharing drug paraphernalia increase the risk of HIV infection. Students must also be taught the skills needed to avoid or reduce risky behaviors. Programs for school aged youth should be developed to address the needs and developmental levels of students as well as those who do not attend school. The specific needs of minorities, persons with different primary languages and those with visual or hearing impairments must also be addressed.
b. The only sure way to avoid infection through sex is to abstain from sexual intercourse or to engage in mutually monogamous sexual intercourse with someone known to be uninfected. In other situations, latex condoms must be used correctly every time a person has vaginal, anal or oral sex. Latex condoms with water based lubricants have been shown to reduce the risk of sexual transmission.
c. Expansion of facilities for treating drug users would reduce HIV transmission. Programs that instruct needle users in decontamination methods and needle exchange programs have been evaluated and shown to be effective.
d. Anonymous and/or confidential HIV counseling and testing sites are in operation in all states of the USA. Counseling, voluntary HIV testing and medical referrals should be offered routinely: in STD, tuberculosis and drug treatment clinics; in clinics offering prenatal care or family planning services; in facilities that offer services to gay men; and in communities where HIV seroprevalence is high. Sexually active persons should be advised to seek prompt treatment for STDs.
e. All pregnant women should be counseled about HIV early in pregnancy and encouraged to be tested for HIV infection as a routine part of standard antenatal care. Those found to be HIV positive should be evaluated to assess their need for zidovudine (ZDV) therapy to prevent in utero and perinatal HIV transmission.
f. Regulations have been established by the US Food and Drug Administration (FDA) to prevent HIV contamination of plasma and blood. All donated units must be tested for HIV antibody; only donations testing negative can be used. People who have engaged in behaviors that place them at increased risk of HIV infection must not donate plasma, blood, organs for transplantation, tissue or cells (including semen for artificial insemination). Organizations (including sperm banks, milk banks or bone

banks) that collect plasma, blood or organs should inform potential donors of this recommendation and must test all donors. When possible, donations of sperm, milk or bone should be frozen and stored for 3-6 months. Donors who test negative after that interval can be considered not to have been infected at the time of donation.

g. Physicians should adhere strictly to medical indications for transfusions. The use of autologous transfusions should be encouraged.
h. Only clotting factor products that have been screened and treated to inactivate HIV should be used.
i. Care should be taken in handling, using and disposing of needles or other sharp instruments. Health care workers should wear latex gloves, eye protection and other personal protective equipment in order to avoid contact with blood or fluids that are visibly bloody. Any patient's blood on the worker's skin should be washed off with soap and water without delay. These precautions should be taken in the care of all patients and in all laboratory procedures ("universal precautions").
j. WHO recommends immunization of asymptomatic HIV-infected children with the EPI vaccines; those who are symptomatic should not receive BCG vaccine. In the USA, BCG and oral polio vaccines are not recommended for HIV infected children regardless of symptoms; live Measles-Mumps-Rubella vaccines are recommended for all HIV infected children.

2. Control of patient, contacts and the immediate environment:

a. Report to local health authority.
b. Isolation: Isolation of the HIV positive individual is unnecessary, ineffective and unjustified. Universal precautions apply to all hospitalized patients. Observe additional precautions appropriate for specific infections that occur in AIDS patients.
c. Concurrent disinfection: Of equipment contaminated with blood or body fluids and with excretions and secretions visibly contaminated with blood and body fluids by using bleach solution or tuberculocidal germicides.
d. Quarantine: None. Patients and their sexual partners should not donate blood, plasma, organs for transplantation, tissues, cells, semen for artificial insemination or breast milk for human milk banks.
e. Immunization of contacts: None.
f. Investigation of contacts and source of infection: In the USA, notification of sexual and needle sharing partners should, whenever possible, be made by the HIV infected individual. Provider referral is justified only when the patient, after due counseling, still refuses to notify his/her partner, and when the health care provider is certain that no harm will be done to the index case if the partner is notified. Care must be taken to protect patient confidentiality.
g. Specific treatment: Early diagnosis of infection and referral for medical evaluation are indicated. Consult more current sources of information for appropriate drugs, schedules and doses. Periodic updates of HIV/AIDS treatment guidelines are available from the CDC National AIDS Clearinghouse (1-800-458-5231) and are posted on the Clearinghouse World Wide Web site (http://www.cdcnpin.org).
    i. Prior to the development of relatively effective antiretroviral treatment, routinely available in the USA around the mid-1990s, treatment was available

only for the opportunistic diseases that resulted from HIV infection. Prophylactic use of oral TMP-SMX, with aerosolized pentamidine as a less effective backup, is recommended to prevent P. carinii pneumonia. All HIV infected persons should receive tuberculin skin tests and be evaluated for active disease. If active TB is found, patients should be placed on antituberculous therapy. If no active TB is found, patients who are tuberculin positive or are anergic but were recently exposed should be offered preventive therapy with isoniazid for 12 months.

ii. Decisions to either initiate or change antiretroviral therapy should be guided by monitoring the laboratory parameters of both plasma HIV RNA (viral load) and CD4+ T cell count and by assessing the clinical condition of the patient. Results of these two laboratory tests provide important information about the virologic and immunologic status of the patient and the risk of disease progression to AIDS. Once the decision to initiate antiretroviral therapy has been made, treatment should be aggressive with the goal of maximal viral suppression. In general, a protease inhibitor and two nonnucleoside reverse transcriptase inhibitors should be used initially. Other regimens may be used but are considered less than optimal. Special considerations apply to adolescents and pregnant women, and specific treatment regimens for these patients should be used.

iii. Up to mid-1999, the only drug shown to reduce the risk of perinatal HIV transmission was AZT when administered according to the following regimen: administered orally antenatally after 14 weeks gestation and continued throughout pregnancy; intravenously administered during the intrapartum period; and administered orally to the newborn for the first 6 weeks of life. This chemoprophylactic regimen was shown to reduce the risk of perinatal transmission by 66%. A shorter course of AZT treatment had been shown to reduce the risk of perinatal transmission by about 40%.

A study reported out of Uganda in July 1999 found that a single dose of nevirapine given to HIV infected mothers during labor, followed by a single dose given to the newborn within 3 days of birth, gave better results than both the long and short course azidothymidine (AZT) regimens. Just 13.1% of the nevirapine treated infants became infected with HIV, compared with 25.1% of the AZT treated group. Nevirapine is less than $4 a dose, so the prospects of preventing mother to infant transmission of HIV in developing countries may be more feasible in the new millennium. However, development of the necessary HIV testing and counseling services for antenatal females in the poorest developing countries in Africa remains a daunting challenge. In addition, the general lack of anti-HIV treatment for adults means that the number of AIDS related orphans in these countries will increase.

iv. Management of health care workers (HCWs) occupationally exposed to blood and other body fluids suspected to contain HIV is complex. The nature of the exposure and factors such as possible pregnancy and drug resistant HIV strains must be considered before HIV postexposure prophylaxis (PEP) is recommended. As of late 1999, recommendations for PEP include a basic 4-week regimen of two drugs (zidovudine and lamivudine) for most HIV

exposures, as well as an expanded regimen that includes the addition of a protease inhibitor (indinavir or nelfinavir) for HIV exposures that pose an increased risk of transmission or where resistance to one or more of the antiretroviral agents recommended for PEP is known or suspected. Health care organizations should have protocols that promote and facilitate prompt access to postexposure care and reporting of exposures.

3. Epidemic measures

HIV is currently pandemic, with large numbers of infections reported in the Americas, Europe, Africa and southeast Asia. See B1, above, for recommendations.

4. International measures

A global prevention and care program coordinated by WHO was initiated in 1987. Since 1995, the global AIDS program has been coordinated by UNAIDS. Virtually all countries throughout the world have developed an AIDS prevention and care program. Several nations have instituted requirements for AIDS or HIV examinations for entry by foreign travelers (mainly those applying for resident or longer term visas, such as for work or study). WHO and UNAIDS have not endorsed these measures.